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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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ED 059293

# TECHNICAL REPORT

# ON

# STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

# FOR

# DECORATOR 6-24.234

# B-223
# or
# S-15

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GATB #569
5-50

# STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR DECORATOR 6-24.234

B-223 or S-15

## Summary

The General Aptitude Test Battery was administered by the Wisconsin State Employment Service to 34 Decorators 6-24.234 employed by the Slocum Hat Corporation of Milwaukee, Wisconsin, in order to develop a selection battery for this occupation. The criterion used in developing a selection battery consisted of the average earnings of each worker for the first quarter of 1950. The following aptitudes were found to be significant for this occupation: Spatial (S), Aiming (A), and Finger Dexterity (F). All of the tests in the General Aptitude Test Battery measuring these aptitudes were included in the selection battery.

## Selection Aptitude Test Battery

The selection aptitude test battery for the occupation of Decorator 6-24.234 consists of the General Aptitude Test Battery measuring Aptitudes S, A, and F. The approximate administration time for those tests is 50 minutes. Applicants must meet the critical aptitude score on all aptitudes to be referred as test selected for this occupation.

Table I shows the final battery with the acceptable scores for each aptitude.

TABLE I

Minimum Acceptable Aptitude Scores for B-223 or S-15

| Aptitude | Tests | Minimum Acceptable Aptitude Scores (Total of Converted Test Scores) | B-1002 |
|---|---|---|---|
| S | CB-1-F<br>CB-1-H | ~~87~~ 85 | 80 |
| A | CB-1-C<br>CB-1-K | B-1001 69 70 | 70 (K) |
| F | CB-1-O<br>CB-1-P | ~~76~~ 75 | 70 |

## Effectiveness of Battery

This analysis shows that 77% of the lower efficiency workers would never have been hired if this battery had been used as a selection device. Among those who pass 17% are lower efficiency workers. Of the higher efficiency workers 29% would not have been hired if this battery had been used as a selection device. Among those who pass 83% are of the higher efficiency workers.

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TECHNICAL REPORT

I. Problem

This study was conducted for the primary purpose of developing a specific aptitude test battery for the selection of trainees for the occupation of Decorator 6-24.234. A second purpose was to secure data for General Aptitude Test Battery standardization.

II. Sample

The population consists of 49 Decorators employed by the Slocum Hat Corporation of Milwaukee, Wisconsin. Of these 49 tested, 15 were eliminated; twelve because of age, two because of lack of interest in the test and one because of failure to follow instructions.

Workers were hired on the basis of a personal interview. No tests were used for screening purposes. The only educational requirement was the ability to read.

Table II shows the Means (M), Standard Deviations ($\sigma$), Ranges, Product-Moment Correlations (r) with the Criterion and Standard Errors of Correlations ($\sigma_r$) for age, education and experience for the total sample.

TABLE II

Means (M), Standard Deviations ($\sigma$), Ranges, Product-Moment Correlations with the Criterion (r) and Standard Errors ($\sigma_r$) for Age, Education and Experience

Decorator 6-24.234

N = 34

| | M | $\sigma$ | Range | r | $\sigma_r$ |
|---|---|---|---|---|---|
| Age | 45.3 | 10.0 | 20-58 | -.122 | .169 |
| Education (yrs.) | 8.6 | 1.4 | 7-12 | -.086 | .170 |
| Experience (mos.) | 40.2 | 105.4 | 3-304 | .138 | .168 |

Insofar as this sample is concerned, there was no significant relationships found between the criterion and age, education or experience. The firm considers one season of 7 months duration as the minimum length of time to become experienced on the job. Two workers with only 3 and 4 months of experience were included because the employer stated that they were progressing very satisfactorily.

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JOB TITLE: Decorator (hat & cap) 6-24.234

Job Summary:

Stitches trimmings, such as ribbons, bows, artificial flowers, and buckles to women's hats according to a sample or to directions.

Work Performed

Sews, by hand, trimmings such as ribbons, bows, feathers, flowers, veils and ornaments to women's hats. Using a model for work direction, artistically arranges trimmings, which have been preselected and cut to size, on hats and secures them using thread, needle, and thimble. Exercises care to make each hat an exact copy of the model. Trims both felt and straw hats. May sew labels into hat band.

III. Experimental Battery

All of the parts in the General Aptitude Test Battery, with the exception of Part E, were administered to the sample group.

IV. Criterion

The criterion is the straight piece rate earnings of each worker for the three months' period of January 1, 1950, through March 25, 1950. This does not include overtime for any worker. All workers earning an average of $0.75 per hour or over were considered to be satisfactory and were rated high. Those earning less than $0.75 per hour were rated low. Although the employer stated he thought the workers in this plant were not up to the standards of some other firms and he felt the firm would prefer workers who could produce and earn more, he would consider anyone earning $0.75 per hour or more as satisfactory.

V. Statistical and Qualitative Analysis

Table III shows the Means (M), Standard Deviations ($\sigma$), Standardized Means (M') and Standard Deviations ($\sigma'$), Product-Moment Correlation (r) with the Criterion, and Standard Errors of the Correlations ($\sigma_r$) for each test of the General Aptitude Test Battery.

Table IV shows the Means (M), Standard Deviations ($\sigma$), Product-Moment Correlation (r) with the Criterion and Standard Errors of the Correlations ($\sigma_r$) for each aptitude of the General Aptitude Test Battery.

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TABLE III

Means (M), Standard Deviations ($\sigma$), Standardized Means (M') and Standard Deviations ($\sigma'$), Product-Moment Correlation (r) with the Criterion and Standard Errors of the Correlations ($\sigma_r$) for each Test of the General Aptitude Test Battery

Decorator 6-24.234

N = 34

| Test | M | $\sigma$ | M' | $\sigma'$ | r | $\sigma_r$ |
|---|---|---|---|---|---|---|
| A | 19.7 | 4.6 | 96 | 17 | -.016 | .171 |
| B | 33.1 | 15.3 | 82 | 16 | -.136 | .168 |
| C | 39.5 | 7.2 | 88 | 20 | .466 | .134 |
| D | 22.0 | 8.0 | 88 | 21 | -.088 | .170 |
| F | 18.5 | 7.3 | 90 | 18 | .263 | .160 |
| G | 124.0 | 23.8 | 89 | 24 | .284 | .158 |
| H | 17.1 | 4.7 | 99 | 14 | .198 | .165 |
| I | 7.0 | 2.9 | 90 | 17 | .142 | .168 |
| J | 14.7 | 6.0 | 87 | 14 | .011 | .171 |
| K | 64.3 | 9.3 | 87 | 19 | .377 | .141 |
| L | 21.4 | 7.1 | 88 | 19 | .105 | .170 |
| M | 84.9 | 9.4 | 93 | 23 | .134 | .168 |
| N | 98.1 | 8.9 | 94 | 21 | .386 | .146 |
| O | 27.4 | 5.0 | 100 | 22 | .456 | .136 |
| P | 26.7 | 4.3 | 89 | 24 | .326 | .153 |

TABLE IV

Means (M), Standard Deviations ($\sigma$), Product-Moment Correlation (r) with the Criterion and Standard Errors of the Correlations ($\sigma_r$) for each Aptitude of the General Aptitude Test Battery

Decorator 6-24.234

N = 34

| Aptitude | M | $\sigma$ | r | $\sigma_r$ |
|---|---|---|---|---|
| G | 89.7 | 14.4 | .139 | .168 |
| V | 86.6 | 13.0 | .017 | .171 |
| N | 87.2 | 19.1 | .001 | .171 |
| S | 97.5 | 14.1 | .222 | .163 |
| P | 92.2 | 16.4 | .064 | .171 |
| Q | 82.1 | 15.3 | -.134 | .168 |
| A | 85.6 | 19.7 | .471 | .133 |
| T | 86.2 | 21.1 | .351 | .150 |
| F | 94.7 | 21.3 | .483 | .131 |
| M | 92.0 | 20.3 | .251 | .161 |

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In interpreting Tables III & IV consideration should be given to the following:

A. The job analysis indicates that the following worker characteristics measured by the General Aptitude Test Battery were required by the occupation in significant amounts:

1. Aiming - Aptitude A - required in the ability to arrange, place, and sew trimmings to hat by hand.
2. Spatial - Aptitude S - required in the ability to arrange, and place trimmings on hats.
3. Finger Dexterity - Aptitude F - required in the ability to use the fingers to arrange, place and sew trimmings to hat.
4. Motor Speed - Aptitude T - required in the ability to do repetitive work at a high rate of speed.

B. Considering the mean aptitude scores in Table III, Aptitudes F and S were found to be most significant to the characteristics shown as being necessary by the occupation as indicated by the job analysis.

The standard deviations of Aptitudes A and S indicates that for these aptitudes this group is more homogeneous than is the general population since for these tests the standard deviation is below 20, the norm for the general population.

C. The Correlation Coefficients of Aptitudes A and F are more than twice their standard error.

VI. Selection of the Final Battery

In view of the above statistical data and in respect to their relationship to successful job performance, the following aptitudes should be included in a selection battery for Decorator 6-24.234:

1. Aiming
2. Spatial
3. Finger Dexterity

On the basis of a high correlation coefficient ($r = .483; \sigma_r = .131$) and its relationship to successful performance in this occupation as shown by the job analysis, Aptitude F was selected to be included in the battery. Aptitude A was included on the basis of job analysis and a high correlation coefficient ($r = .471; \sigma_r = .133$). Aptitude S was included on the basis of a relatively high mean (97.5), a low standard deviation (14.1) and on the basis of job analysis. Aptitude T was not included because of its low mean (86.2) and high standard deviation (21.1).

Based on these considerations a selection battery was set up measuring Aptitudes A, S and F. Critical scores were set approximately one standard deviation below the mean. The critical score for each aptitude is as follows: A = 69, S = 87 and F = 76. A tetrachoric correlation coefficient together with its standard error was computed with these critical scores. The results are indicated in Table V.

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TABLE V

Efficiency of Battery A, S, F with Critical Aptitude Scores of 69, 87 and 76 Respectively and Criterion Critical Score of 75

Decorator 6-24.234

N = 34

| | | Test Battery | | Total |
|---|---|---|---|---|
| | | Fail | Pass | |
| Criterion | High | 6 | 15 | 21 |
| | Low | 10 | 3 | 13 |
| Total | | 16 | 18 | 34 |

$r_{tet}$ = .747 $\sigma_{r_{tet}}$ = .274

Table V contains data which indicates that 15 or 71% of the workers in the high criterion group pass the battery and 6 or 29% of the workers in this group fail the battery; in the low criterion group 3 or 23% pass the battery and 10 or 77% fail the battery. Table V also indicates that of the workers who pass the battery 15 or83% of them are in the high criterion group and 3 or 17% are in the low criterion group; of those who fail the battery 6 or 38% are in the high criterion group and 10 or 62% are in the low criterion group.

## VII. Conclusion

On the basis of all considerations discussed in this report it appears that the significant aptitudes for this battery are A, S and F. The critical scores for the recommended battery for Decorator